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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/696,788

10/30/2003

Shufeng Han

16569-US

8112

30689

7590

05/30/2008

DEERE & COMPANY  
ONE JOHN DEERE PLACE  
MOLINE, IL 61265

EXAMINER

DIACOU, ARI M

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

05/30/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/696,788	<b>Applicant(s)</b> HAN ET AL.	
	<b>Examiner</b> ARI M. DIACOU	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-45 is/are pending in the application.
- 4a) Of the above claim(s) 31-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-30 and 41-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2-28-2008</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Prosecution Application***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2-28-2008 has been entered.

### ***Response to Arguments***

2. In the remarks filed 2-28-2008, applicant argued the following:
- A. On page 7, that "Szczerba does not teach or suggest Applicant's claimed invention since Szczerba teaches that the aspect angle is the orientation of a vehicle in relation to battlefield threats."
  - B. On page 7, that "Since none of the references takes into consideration a maximum slope having nonzero values for a longitudinal component and a lateral component, and an aspect angle between the direction of the maximum slope and an axis with which a direction of travel is coincident, when estimating roll or pitch data, none of the references teaches or suggests, alone or in any combination Applicant's claimed invention."

3. Argument A is moot in view of the new grounds of rejection, which has been necessitated by amendment.
4. Argument B is moot in view of the new grounds of rejection, which has been necessitated by amendment.

***Claim Rejections - 35 USC § 103***

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
6. Claims 21-30 and 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diefes (USP No. 5534875) in view of Szczerba (USP No. 6182007).
  - Regarding claim 21, Diefes discloses a method of guiding a vehicle, the method comprising:
    - estimating at least one of roll data [Fig. 2, #52] and pitch data [Fig. 2, #54] corresponding to the particular location [wherever the inclinometers happen to be], the roll data associated with a corresponding lateral slope, the pitch data associated with a corresponding longitudinal slope generally perpendicular to the lateral slope [it appears that Diefes discloses in Cols. 10 and 11 and applicant claims, roll and pitch as canonically defined], wherein each of the roll data and pitch data are separately estimated [Fig. 2, #52 and #54] using

- i) a maximum slope of ground [This is referred to as attitude in Diefes, see e.g. Abstract] with respect to a reference point [Location of vehicle] traversed by the vehicle corresponding to the particular location, and the maximum slope [attitude] having a non-zero longitudinal slope [pitch] component and a non-zero lateral slope component [roll], and
- ii) an aspect angle between a direction of the maximum slope and an axis with which a direction of travel is coincident [This is the angle that would be considered “azimuth” by Diefes, see Col. 11]

but fails to disclose:

- establishing elevation data and corresponding location data for a work area divided into cells;
- determining location data, including a particular location of a vehicle, within the work area;
- guiding the vehicle steering in a direction of travel with compensation data based upon at least one of the estimated roll data and the pitch data such that an actual path of the vehicle follows a target path.

Szczerba teaches \*\*\*

- establishing elevation data [“terrain feaures”, Col. 1 lines 60-63 and Col. 2, lines 46-51] and corresponding location data [Could be grid name (e.g. “B2”, current location, map grid weights or threat location 214, all

disclosed in Figs. 1 and 2] for a work area divided into cells [Fig. 2, and Col. 1, lines 50-54];

- determining location data [Map weights, Col. 2, lines 15-45], including a particular location of a vehicle [A route planner as disclosed must inherently be aware of the location of the vehicle], within the work area [Fig. 2];
- guiding the vehicle steering in a direction of travel [Col. 7, lines 30-32] [“autonomous robotics”, Col. 1, lines 11-12] with compensation data [Map weights, based on aspect angle] based upon at least one of the estimated roll data and the pitch data [Col. 6, lines 9-11] such that an actual path of the vehicle follows a target path [Fig. 4, #422].

Therefore, it would have been obvious to one skilled in the art (e.g. a vehicular engineer) at the time the invention was made, to combine the teachings of Szczerba and Diefes, for the advantage of creating routes for a vehicle for which excessive gradients pose a threat of tipping, such as a tank or heavy farm equipment.

- Regarding claim 22, Diefes discloses Col. 11, example 1.
- Regarding claim 23, Szczerba discloses “terrain data” in Cols. 1 and 2.
- Regarding claim 24, Szczerba discloses Col. 6 lines 9-11.
- Regarding claim 25, Szczerba discloses Col. 1, #12.
- Claims 28 and 30 are merely the methods by which one of ordinary skill would normally calculate pitch and roll angles.

- Regarding claim 27 and 29, Szczerba discloses "terrain data" and Diefes estimates pitch based on the phase differences from GPS transmissions, which would qualify as location data.
- Regarding claim 41, Diefes discloses "aspect" as the "attitude" as discussed in the rejection to claim 21.
- Regarding claim 44, Diefes discloses an upper bound of his "grid size" to be the distance between two GPS antennas, which he requires to be less than 1 wavelength of the GPS carrier wave, and must be less than the size of the vehicle. [Col. 8, lines 20-40]
- Regarding claim 45, Szczerba discloses Figs. 1 and 2.

7. Claims 26, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szczerba and Diefes as applied to claims 21-25, 27-30, 41 and 45 above, and further in view of Staub (USP No. 6236916). Szczerba and Diefes disclose the invention with all the limitations of claim 21, but fails to disclose real-time steering compensation for deviations from the planned path. Staub teaches a farm vehicle with an auto pilot that follows a planed route [Fig. 5, #514-#524], and compensates for errors caused by the roll of the vehicle [Fig. 4]. Therefore, it would have been obvious to one skilled in the art (e.g. a vehiclular engineer) at the time the invention was made, to use the autopilot of Staub in the combination of Szczerba and Diefes, for the advantage of adhering to the mission critical path that was devised for the vehicles mentioned at the top of Szczerba, Col. 1.

***Conclusion***

8. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

9. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/AMD/



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30-May-08

/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663